AQA – Equilibrium constant Kp for homogeneous systems – A2 Chemistry P1

1. June/ 2021/Paper_1/No.5

0 5 This question is about the equilibrium

$$2\,SO_2(g) + O_2(g) \rightleftharpoons 2\,SO_3(g)$$

0 5 . 1 State and explain the effect, if any, of a decrease in overall pressure on the equilibrium yield of SO_3

[3 marks]

Effect _____

Explanation _____

_____

_____

0 5 . 2 A 0.460 mol sample of SO_2 is mixed with a 0.250 mol sample of O_2 in a sealed container at a constant temperature.
When equilibrium is reached at a pressure of 215 kPa, the mixture contains 0.180 mol of SO_3

Calculate the partial pressure, in kPa, of SO_2 in this equilibrium mixture.

[4 marks]

Partial pressure of SO_2 _____ kPa

0 5 . 3 A different mixture of SO_2 and O_2 reaches equilibrium at a different temperature.

Table 4 shows the partial pressures of the gases at equilibrium.

Table 4

Gas	Partial pressure / kPa
SO_2	1.67×10^2
O_2	1.02×10^2
SO_3	1.85×10^2

Give an expression for the equilibrium constant (K_p) for this reaction.

Calculate the value of the equilibrium constant for this reaction and give its units.

[3 marks]

K_p

K_p _____

Units _____

0 5 . 4 What is the effect on the value of K_p if the pressure of this equilibrium mixture is increased at a constant temperature?

$$2\,SO_2(g) + O_2(g) \rightleftharpoons 2\,SO_3(g)$$

[1 mark]

Tick (✓) **one** box.

The value of K_p

increases. ☐

stays the same. ☐

decreases. ☐